



Space Systems Department

Avionics Design

The Avionics Design Division performs full-cycle, conceptualization-to-finished-product development of electronic control systems, data systems, and flight instrumentation systems products. In addition, this Division delivers flight instruments, imaging systems, inertial components, and high-quality optics.

- Performs research, engineering, design, development, technology development, analysis, test and evaluation of:
 - Instrumentation and advanced sensors
 - Control (including embedded) and signal conditioning for analog, digital, or hybrid electronics circuits
 - Imaging and video systems
 - Radio Frequency (RF) systems
 - Advanced Optics
- Provides research, designs, plans, coordinates, and directs the application of components and subsystem for guidance, navigation, and control.
- Performs design and development of computer controlled subsystems, such as engine controllers and data systems, for space flight and ground support avionics systems.
 - Analysis and test of flight computers and data systems for space vehicles, experiments, and payload.
 - Flight computers, data acquisition systems, data storage devices, and audio communication.
 - Fabricate and test automated ground computer systems.



Navigation Components Development Laboratory



Modular Adaptive Controller Printed Circuit Board



Monolithic X-ray Replicated Mirror Development

Data & RF Systems

The Data and RF Systems Branch designs and develops flight computers and data systems for space vehicles, experiments, and payloads. The Branch also provides theoretical and expert knowledge of RF Communication Components, Range Safety Systems, Global Positioning Systems, and Antenna Pattern testing.

The Data and RF Systems Branch's three teams:

The Digital Systems Design Team performs analysis, design, development, and test of flight computers and data systems for space vehicles, experiments, and payloads. This team also conducts research and technology development applicable to flight computers, data systems, and rocket engine controllers.

The Data Systems Development Team provides insight responsibility for the development, test, verification, and implementation of flight data systems including flight computers, data acquisition systems, data storage devices, and audio communication. This team also conducts research and development of flight data systems technology, and designs, develops, and tests special test equipment (ground computers and data systems) to test flight hardware and software for its required functionality.

The RF and Communications Team provides theoretical and Practical Knowledge of RF Communication Components and Systems that includes Transponders, Transmitters, and Receivers. The Team also provides expert knowledge: in Range Safety Systems for Launch Vehicles; Global Positioning Systems; Antenna Pattern Testing; and TDRSS Communication Systems.

Control & Signal Conditioning Electronics

The Control & Signal Conditioning Electronics Branch performs research, design, development, implementation of electronic control systems, digital electronic systems, and subsystems for motion and thermal control devices, servomechanisms, instrumentation signal conditioning, and embedded control for both space flight and ground hardware.

The Control & Signal Conditioning Electronics Branch consists of the Control Electronics Team and the Signal Conditioning Electronics Team.

- The Control Electronics Team provides electronic controls for precision rate position and environmental control for spaceflight vehicles and experiments. This team is also responsible for the definition, research, design, development, implementation and test of embedded control and data acquisition circuits and systems.
- The Signal Conditioning Electronics Team provides research, design, development, and implementation of electronic systems for signal conditioning, space and earth-bound science experiments and instruments, and thermal control.

Sensors, Imaging and Optics

The Sensors, Imaging and Optics Branch performs research, design, development, implementation and test of measurement sensors, instrumentation systems, and imaging and video systems for both space flight and ground hardware. The Branch also provides expert knowledge and fabrication capabilities in the area of advanced optics.

This Branch consists of the Imaging Team, Sensors Team, and Optics Team.

The Sensors Team provides research, design, development, test, evaluation, and implementation of measurement sensors for space flight applications; Guidance, Navigation and Control Hardware; and Pointing Control and Attitude Determination Systems.

The Imaging Team provides imaging for applications including Ares, Shuttle, Microgravity, and Earth Science experiments. Imaging systems include:

- Video Systems for experiments, microgravity, earth science, space science, robotic applications, and flight vehicles
- Charge Coupled Device (CCD) Arrays
- Image Processing
- X-Ray Detectors
- Film Systems

The Optics team performs research, fabrication, and technology development in the area of advanced optics.

Provides design and fabrication expertise in:

- Cameras
- Inspection devices
- Lasers
- Lenses
- Medical imaging devices
- Navigation equipment
- Property and safety monitoring devices
- Satellites
- Telescopes
- Video hardware

Provides unique insight into the complex techniques and technologies involved in designing, fabricating, testing, and analyzing high-quality optics:

- Optical and optomechanical design
- Diamond turning
- Grinding and polishing
- Coating
- Metrology
- Optical performance testing
- Optical analysis

Point-of-Contact:

Kurt Jackson, Avionics Design Division Chief ■ (256) 544-3445 ■ kurt.jackson@nasa.gov